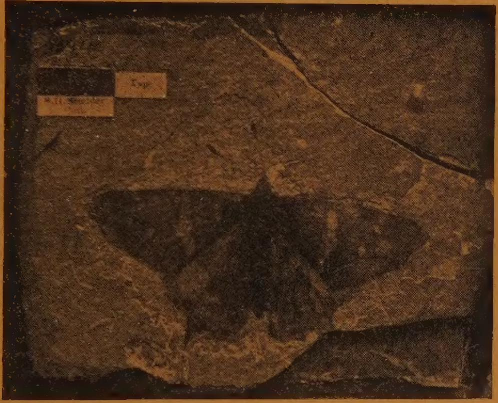
PSYCHE

A JOURNAL OF ENTOMOLOGY

ESTABLISHED IN 1874

VOL. XXIII APRIL, 1916 NUMBER 2



Prodryas persephone Scudder.

CONTENTS.

Further Studies on the Platypezidæ. *C. W. Johnson* 27
Two New Texan Parajueli. *R. V. Chamberlain* 33
The Pupa of *Boreus brumalis* Fitch. *F. X. Williams* 36
A Nematode Parasite of Root Aphids. *J. J. Davis* 39
Some New Formicid Names. *W. M. Wheeler* 40
New Encyrtidæ from North America. *A. A. Girault* 41
Three New North American Species of the Genus Agromyza. *J. R. Malloch* 50
A New Species of Thripoctenus. *L. T. Williams* 54
Exchange Column 62

CAMBRIDGE ENTOMOLOGICAL CLUB.

OFFICERS FOR 1916.

President: . . . . A. F. Burgess.
Vice-president: . . . . F. G. Carnochan.
Secretary: . . . . H. M. Parshley.
Treasurer: . . . . F. Waldo Dodge.
Executive Committee:
C. W. Johnson, J. W. Chapman, R. W. Glaser.

EDITORIAL BOARD OF PSYCHE.

EDITOR-IN-CHIEF.

C. T. Brues, Harvard University.

ASSISTANT EDITOR.

J. W. Chapman, Harvard University.

ASSOCIATE EDITORS.

C. W. Johnson,
Boston Society of Natural History.

A. L. Melander,
Washington State College.

J. H. Emerton,
Boston, Mass.

V. L. Kellogg,
Stanford University.

A. P. Morse,
Wellesley College.

J. G. Needham,
Cornell University.

W. M. Wheeler,
Harvard University.

Psyche is published bi-monthly, the issues appearing in February, April, June, August, October and December. Subscription price, per year, payable in advance: $1.50 to subscribers in the United States, Canada or Mexico; foreign postage 15 cents extra. Single copies, 35 cents.

Cheques and remittances should be addressed to F. Waldo Dodge, Melrose Highlands, Mass.

Orders for back volumes, missing numbers, notices of change of address, etc., should be sent to Dr. J. W. Chapman, Bussey Institution, Forest Hills, Boston, Mass.

IMPORTANT NOTICE TO CONTRIBUTORS.

Manuscripts intended for publication, books intended for review, and other editorial matter should be addressed to Professor C. T. Brues, Bussey Institution, Forest Hills, Boston, Mass.

Authors contributing articles over 8 printed pages in length will be required to bear a part of the extra expense for additional pages. This expense will be that of typesetting only, which is about one dollar per page. The actual cost of preparing cuts for all illustrations must be borne by contributors; the expense for full page plates from line drawings is approximately $2.40 each, and for full page half-tones $3.60 each, smaller sizes in proportion.

REPRINTS OF ARTICLES CAN BE SUPPLIED AT THE FOLLOWING RATES:

Number of pages	50 copies without covers	100 copies without covers	50 copies with covers	100 copies with covers
1–4	$1.50	$2.50	$3.50	$4.50
5–8	3.50	5.80	5.50	7.80
9–12	4.25	7.05	6.25	9.05
13–16	4.75	7 90	6.75	9.90

No reduction can be made for less than 50 copies.

PSYCHE

VOL. XXIII APRIL, 1916 No. 2

FURTHER STUDIES ON THE PLATYPEZIDÆ.

By Charles W. Johnson.
Boston Society of Natural History, Boston, Mass.

Since publishing a "Revision of the Species of Agathomyia" (Psyche, Vol. 17, p. 7, February, 1910) material has accumulated which I have put aside year after year, hoping that in time I should have sufficient material to show satisfactorily the positive relation of the sexes of what are probably the male and female of the same species. The notes appended to the following description will show the difficulties attending this work, the results of which, after six seasons of careful collecting, being rather discouraging. It is therefore with great misgivings that I name some of the described forms, but by so doing, if synonyms should arise, they can be more clearly and readily relegated to their proper standing, than by referring them doubtfully to described species.

Agathomyia Verrill.

Table of Species

1. Thorax and abdomen fulvous 2
   Thorax and abdomen largely black 4
   Thorax and abdomen cinereus (females) 8
2. Without black on the abdomen, ♀ (Me., N. H.) . . . *fulva* Johns.
   With black on the abdomen 3
3. The last two segments of the abdomen and halteres black, ♂ (N. Y.) . . . . *perplexa* sp. nov.
   The last segment of the abdomen, pleura and metanotum black; halteres yellow, ♂ (Mass.) . . . . *dubia* sp. nov.
4. Abdomen broadly banded with yellow 5
   Abdomen not banded with yellow 7

5. Scutellum yellow, ♂, ♀ (N. H., Vt., Mass., R. I.) *pulchella* Johns.
Scutellum black....................................6
6. Posterior metatarsi broad, oblong, ♂ (N. Y., Me.) *vanduzeei* sp. nov.
Posterior metatarsi broad, ovate and truncate, ♂ (N. H., N. Y.)..................................*cushmani* sp. nov.
7. Thorax and abdomen both maculated with greenish white, halteres black (N. H., Mass., N. Y., N. J., Pa., Kan.) *notata* Loew
Thorax only maculated with greenish white, halteres yellow (Pa., D. C.)..........................*divergens* Loew
Thorax and abdomen without maculations, tip of the abdomen in the female cinereous, knobs of the halteres black (N. H., Mass.)..................................*talpula* Loew
8. Abdomen grayish on a yellow ground, with broad black triangles..............................*vanduzeei* sp. nov.
Abdomen grayish on a blackish ground (Mass.) var.? *obscura* var. nov.

Agathomyia dubia sp. nov.

♂. Head black, mouth parts and antennæ yellow, aristæ brown. Thorax and scutellum yellow, pleura and metanotum black, pronotum with three rows of black hairs, the outer rows curving towards the humeri, a post-humeral, four notopleural, two supra-alar and one dorsocentral bristles, scutellum with three small lateral and two large apical bristles. Abdomen fulvous, the terminal segment and genitalia black. Legs light yellow, posterior metatarsi not enlarged, scarcely as wide as the tibiæ. Halteres fulvous. Wing hyaline with a long pale yellow stigma. Length, 3 mm.

One specimen, Austen's Brook, Chester, Mass., August 4, 1911. Type in the collection of the Boston Society of Natural History. I have long hesitated in describing this, and since collecting it have made four additional trips to the locality, hoping thereby to get more material. That it may prove to be the male of *A. fulva* is not unlikely, but the black pleura and terminal segment of the abdomen make it very doubtful, while the presence of another equally closely related form leaves only the one alternative to avoid confusion.

Agathomyia perplexa sp. nov.

♂. Head black, mouth parts and base of the antennæ yellowish. Third joint and arista blackish. Thorax: dorsum and pleura fulvous, with rows of hairs and bristles similar to those of *A. dubia*, scutellum fulvous with four large marginal bristles. Abdomen fulvous, the last two segments and genitalia black. Legs yellow, the posterior metatarsi enlarged, slightly wider than the tibiæ, under side of the anterior and posterior femora with a large black bristle near the base. Halteres dark brownish-black. Wings hyaline, stigma very pale, a large black bristle near the base of the costa. Length, 3 mm.

One specimen, Elma, Erie County, N. Y., August 24, 1913, collected by Mr. M. C. VanDuzee. Type in the author's collection.

In general appearance this could also be referred to as the male of *A. fulva*, but the color of the antennæ, halteres and the last two segments of the abdomen would seem to separate it from that species.

Agathomyia fulva Johnson.

A female identical with the type from Capens, Me., was collected in Tuckerman's Ravine, Mt. Washington, N. H., July 21, 1915.

Agathomyia vanduzeei sp. nov.

♂. Face black, grayish pruinose, mouth parts and antennæ yellowish, third joint and arista black, eyes similar to the following species. Thorax with a dorsal line and the central area behind the transverse suture black, the rest of the dorsum, pleura and scutellum brownish. Abdomen, first segment brown, second and third yellow except for a dorsal spot of brown, the rest of the segments velvety black. Halteres dark brown, base of the stalk yellow. Legs yellow, tip, of the posterior femora brown above, posterior metatarsi slightly dilated, apex rounded (Fig. 2). Wings hyaline. Length, 3.5 mm.

♀. Face and front black, grayish pruinose, a bristle on each side of the front just below the ocelli and a vertical bristle on each side of the ocelli, two small ocellar bristles and a row of small bristles on the posterior orbits. Thorax light gray, with three conspicuous rows of black hairs, the middle row abbreviated posteriorly, the others curved outward in front to the humeri; the hairs become gradually larger and end with a large bristle in front of the scutellum, the latter with four large marginal bristles, humeri, postalar callus and scutellum yellow. Abdomen yellowish, grayish pruinose, with wide triangular markings of black on the posterior margins of the second, third and fourth segments, fifth and sixth with a narrow dorsal line of black. Halteres yellow, posterior metatarsi not dilated, in other respects resembling the male.

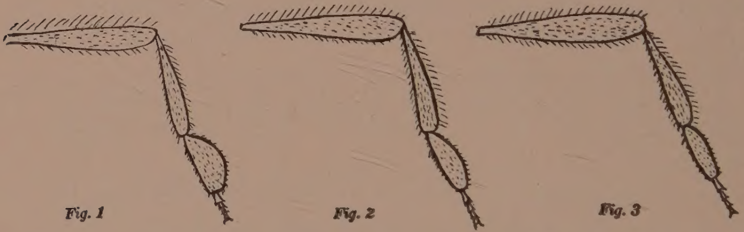


Fig. 1. Portions of hind legs of Agathomyia and Callimyia. Fig. 1, *A. cushmani* sp. nov.; Fig. 2, *A. vanduzeei* sp. nov.; Fig. 3, *C. velutina* sp. nov.

Holotype and allotype, Niagara Falls, N. Y., October 6, 1912 (M. C. VanDuzee), in the author's collection. Paratypes, two females, Colden, N. Y., September 7, 1913, in the collection of Mr. M. C. VanDuzee. One male, Liberty, Me., September 9 (J. A. Cushman) in the collection of the Boston Society of Natural History. The latter measures 4 mm. and has a dorsal stripe of black on the second and third abdominal segments. An imperfect female collected at Hammond's Pond, near Brookline, Mass., September 25, 1913, I am referring doubtfully to this species under the varietal name *obscura*. It lacks the yellow humeri and scutellum, the antennæ are entirely black, and the third joint more attenuated. The abdomen is injured so that the markings are obliterated but no yellow is apparent. Length, 3.5 mm. A number of trips have been made to try and secure more specimens of this interesting form, but in vain.

Agathomyia cushmani sp. nov.

♂. Face black, grayish pruinose, mouth parts and antennæ yellow, third joint and arista dark brown, eyes with a deep median transverse depression, facets of the lower half about one half the size of those of the upper half. Thorax black with three narrow pruinose stripes, bearing rows of fine hairs, the outer rows curving towards the brownish humeri. Scutellum yellowish, pleura black, grayish pruinose. Abdomen, first, second and third segments yellow, a large dorsal spot on the posterior of the third and the remaining segments velvety black. Legs yellow, all of the tarsi and the tips of the posterior femora and tibiæ brownish, posterior metatarsi broadly dilated and truncate, the tarsi short (Fig. 1). Halteres yellow, the knobs brownish. Wings hyaline. Length, 4 mm.

Holotype collected by Dr. J. A. Cushman, on Mt. Passaconaway, N. H., 3,800 feet, September 12, 1912, in the collection of the Boston Society of Natural History. Paratype, Boston, Erie County, N. Y., September 5, 1911 (M. C. VanDuzee), in the author's collection.

This species resembles *A. vanduzeei* but is readily separated by its broader and somewhat truncated metatarsi.

Agathomyia pulchella Johnson.

Since 1910 this species has been collected at Chester, Mass., August 7, 1912; Bretton Woods, June 28, 1913; Mt. Washington carriage road below the second mile post, elevation about 2,400 feet, July 24, 1915, and along the Osgood Trail, near the Glen House, N. H., July 20, 1915.

Callimyia Meigen.

Table of Species

1. Abdomen entirely velvety black, ♂ (N. H., Mass., Ont.) . . . *velutina* sp. nov.
   Abdomen broadly banded with yellow 2
2. Abdomen without silvery gray spots, ♂ (N. M., N. H., Me.) *venusta* Snow.
   Abdomen with silvery gray spots 3
3. Sides of the 1st, 2nd, and 5th segments silvery gray, ♀ . . . *venusta* Snow.
   Sides of the 1st, 2nd, 3rd and 4th and the entire 6th segment silvery gray, ♀ (N. H.) . . . . *proxima* sp. nov.

Callimyia velutina sp. nov.

♂. Face dull grayish black, antennæ black. Thorax, scutellum and abdomen deep velvety black, pleura grayish black. Legs black, anterior and middle tibiæ and tarsi brown, posterior tibiæ and metatarsi somewhat enlarged (Fig. 3). Halteres fulvous, stems brown. Wings hyaline. Length, 4 mm.

This species was collected by the writer along the Mt. Washington carriage road between 2,500 and 3,500 feet, also on the Raymond Path at similar elevations, July 6 to 8, 1914, and July 24 to 28, 1915; at Bretton Woods, N. H., June 28, 1913, and at Chester, Mass., August 5, 1914. A specimen was also received from Mr. M. C. VanDuzee, collected at Brule Lake, Ontario, August 3, 1911. The Chester specimen measures 3.25 mm. and the Ontario specimen, which is about the same size, has the abdomen somewhat shiny, probably owing to its having become damp or greasy.

Holotype (Mt. Washington, July 24) and four paratypes in the collection of the Boston Society of Natural History. One paratype in the Museum of Comparative Zoölogy, one in the collection of Mr. VanDuzee and one in the author's collection.

Callimyia proxima sp. nov.

♀. Front and face black grayish pruinose, antennæ black. Thorax and scutellum black, humeri, a large spot in front of the scutellum and the metanotum grayish pruinose. Abdomen, posterior half of the fifth and all of the second segment except a narrow dorsal line, yellow, the remaining segments black, a large spot on the sides of the second, third, fourth, and all of the sixth segment pearl gray. Halteres yellow. Legs including the coxæ yellow, tips of the anterior and middle tarsi and posterior femora and the entire posterior tibiæ and tarsi black. Wings hyaline. Length, 3 mm.

Two specimens collected on the Mt. Washington carriage road between the two and three mile post, elevation about 3,000 feet, July 16, 1915.

That this may prove to be the female of *C. velutina* is possible, but the bright yellow segments of the abdomen and the legs, which in *C. venusta*, a closely related species, are the same in both sexes, seems to preclude the placing of the two together.

Callimyia venusta Snow.

A male and female of this species previously recorded from Shackford Head, near Eastport, Me., was collected along the Mt. Washington carriage road, above the two mile post, elevation about 3,000 feet, July 16, 1915.

TWO NEW TEXAN PARAJULI.

By Ralph V. Chamberlin,
Museum of Comparative Zoölogy.

The type specimens of the new species of Parajulus here described were collected by J. D. Mitchell at Victoria, Tex., from where they were taken to the field laboratory of the United States Bureau of Entomology at West Lafayette, Ind., and there kept alive for some time. They were sent to me for determination by Mr. W. R. Walton of the bureau mentioned. Isolated descriptions of these two forms are here published in order that the names may be available for early use.

Parajulus texanus sp. nov.

General color light yellowish brown. A dark median dorsal longitudinal line which is dark brown anteriorly and becomes black posteriorly. The usual series of black dots along each side over the repugnatorial glands on all excepting the first few segments; the dots small, angulate. About each segment a narrow dark annulus or line which fades out on the lower part of each side. A series of light brown spots much lighter and less conspicuous than those of the repugnatorial series occur along each side above the legs excepting on the most anterior and most posterior segments. Vertex of head and the antennæ dusky or blackish; the head below level of eyes pale.

Sulcus across vertex of head coarse; extending forwards to a deep transverse sulcus between inner angles of eyes; the transverse sulcus bent back angularly at middle.

Eye patch black; of moderate size; triangular, but with sides convex and the anterior angle truncate. Ocelli on each side in seven subvertical series in the most caudal of which there are ten ocelli, and also forming about ten oblique series. Total number of ocelli in each patch near fifty.

First dorsal plate with the lower border straight, not at all angularly produced. Laterally distinctly margined. With two or three longitudinal striae across caudal border below on each side.

The second and succeeding segments deeply longitudinally striate below on each side. A longitudinal sulcus at level of repugnatorial pore.

Repugnatorial pore moderate or small; a little removed from the suture which is considerably excurved at its level.

Anal tergite with caudal tip acute and subspinous; straight, not at all decurved; exceeding the anal valves.

Anal valves with inner border conspicuously raised, and roughened.

Anal scale with caudal and anterior margins widely and evenly convex, not emarginate, meeting at an acute angle on each side.

Mandibular stipes of male slightly excavated. Strongly produced ventrad.

Promentum of gnathochilarium in the male much enlarged as usual; obovate in outline.

First legs in male strongly enlarged; the penult article narrowing distad, rather long, flattened, very weakly curved. Not strongly uncinate. Inner surface with numerous fine tubercles.

Coxae of second legs in male much enlarged and produced mesally in a linguiform process as usual; the process gradually but not strongly narrowing distad; not enlarged at distal end excepting for a slight extension at each angle.

Exposed part of first division of anterior gonopods of male wide proximally and strongly narrowing distad, the apex obtusely rounded; second or posterior division conspicuously exposed in lateral view, curving above base cephalomesoventrad, then bending more strongly a little caudad of mesad and then strongly back more caudad, the end flattened and the distal edge finely dentate and in contact with that of its mate, the two embracing or lying below a large conical process from the eighth segment.

Posterior gonopods sickle-shaped, crossing each other at the middle.

Number of segments in type, 52.
Length of type, 30 mm.
The description above is of a single male.

Parajulus victorianus sp. nov.

As the specimens of this species had been dried out through the evaporation of the alcohol, the coloration cannot be wholly determined. The dark spots along the sides are decidedly larger than in the preceding species and are less angular, being typically subcircular; they often enclose a light area. In the types no dorsal median longitudinal dark stripe is detectable, though this may be due to the drying and shriveling of the soft parts.

Median sulcus of vertex of head geminate, each half bending sharply ectad at level of eyes and running to the inner angle of eye of the corresponding side and forming part of a transverse sulcus that is angulate at the middle as in the preceding species. Vertex caudally margined, the margining sulcus curving away from the edge on each side as it approaches the middle.

Eye area on each side subpentagonal or subtriangular with the anterior angle broadly obliquely truncate; the caudal side convex as is also the lateral; the mesal side convex or very obtusely angular; the anterior side straight, oblique. Each eye consisting of eight transverse rows of ocelli. Ocelli about 45 in number.

First dorsal plate with lateral border margined, nearly straight; not at all produced below; caudolateral angle subrectangular. Not striate.

Second segment conspicuously longitudinally striate below.

The succeeding segments striate farther dorsad and sonn extending entirely across dorsum.

Repugnatorial pore moderate. Not touching the suture which is weakly excurved at its level.

Anal tergite exceeding the valves; caudal angle as a whole subacute, the apex, however, narrowly rounded; apex short and not extended as a spinous process, slightly depressed.

Mesal borders of anal valves scarcely elevated, roughened.

Mandibular stipes of male with caudal side straight except at distal or lower end where it is abruptly narrowed, leaving a rounded corner or angular projection.

Promentum of gnathochilarium in the male very large, broadly oblong with the sides slightly convex and the corners somewhat rounded, also slightly wider distad.

First legs of male enlarged in the usual degree but longer than usual. The penult article exceptionally long, becoming distally much more slender than the preceding article.

Anterior division of the first gonopods conspicuously clavate; the broad distal end bent caudad, the caudal edge setiegerous; posterior division much longer than the anterior, its base broad but above this narrowing rather abruptly to a blade which curves ventromesad nearly to the middle line, with the posterior angle of the tip extended caudad in a short, slender and very acute process.

The posterior gonopods are broad plates each of which curves first cephaloventrad and then ventrocaudad, the distal portion of the blade narrower but still conspicuously broader than usual, the blade with its broad surface subvertical; the distal end characteristically bifid, the two lobes or teeth short.

The types are broken and as a result the number of segments cannot be accurately determined.

Two broken males form the basis of the description.

In the character of the anterior gonopods this species suggests *P. zakiwanus* Chamberlin, known from New Mexico, but the posterior gonopods are conspicuously different.

THE PUPA OF *BOREUS BRUMALIS* FITCH.

By Francis X. Williams,
Melrose Highlands, Mass.

In the August number of Psyche Dohanian describes and figures *Boreus brumalis*[1] and states that the life-history has not been fully worked out in any species of the genus. The order to which this insect belongs, the Panorpatæ, comprises a small group of neuropteroid forms, among which are the genera *Panorpa*, commonly known as scorpion-flies, *Bittacus* and *Merope*, and whose mouth-parts are borne at the end of a snout-like extension of the head, or rostrum. In general, their life-history is imperfectly known, but the larvæ are said to be terrestrial and carnivorous.

---

[1] Notes on the External Anatomy of *Boreus brumalis* Fitch, Psyche, XXII, pp. 120–123, pl. IX, 1915.

On October 4, 1915, I had the good fortune to unearth a number of *Boreus* pupæ at Andover, Mass., some fifteen miles north of Boston. Others were found in this locality up to October 22, and in two separate localities at Melrose Highlands, the first pupa being taken October 6 and the last on November 23. All were found in neat and rather elongate earthen cells in or just beneath the fine root-work of green moss which was growing at the base of trees, chiefly oaks. At the base of one tree I soon found over a dozen. The pupal cells were vertical or inclined and extended to within one half of an inch or so of the surface of the soil. No pupæ could be found under moss other than that which grew at the base of trees.

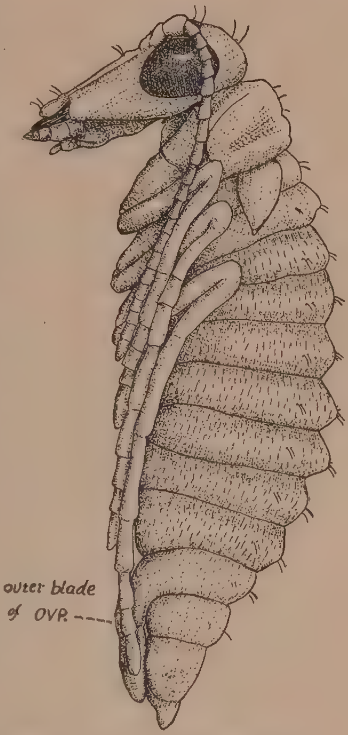


Fig. 1. *Boreus brumalis*, pupa.

The pupa is of the same general shape and size (3.2–3.75 mm.) as the adult. The appendages are free. The mandibles are rather large and 4-dentate and vary somewhat in my three specimens (1♂ and 2♀). The male has two pairs of long, narrow wingcases and the female a single short pair. The male genitalia are terminal and somewhat reflexed and in well advanced pupæ exhibit a stout upturned pair of chitinous clasping organs which are strongly toothed on their concave border. In the female the abdomen terminates in a more or less conical point, which encloses the inner portion of the ovipositor, while the outer blades of the ovipositor are ensheathed in a pair of ventrally appressed appendages that arise from the eighth abdominal segment and do not quite extend to the end of the body. The coxæ are long and stout and probably assist the adult in leaping. There are a few rather long bristles, as shown in the figure, and a short transverse row of little thorns on either side of the mid-dorsal line on abdominal segments 2–5. Under good magnification the surface of the body is finely pointed-granulate. The pupa is at first whitish; but even in the first specimens secured the eyes and mandibles had become quite dark. In well matured examples the body was brownish or greenish yellow and the longer appendages, at first rather closely appressed to the body, showed a tendency to move out of position.

The pupa is easily disturbed and is then decidedly active. The head is moved up and down in a vigorous manner, the mandibles open and shut and the abdomen is twisted around. These movements parallel rather closely those made by the pupa of the Eriocranid moths (Jugatæ) in working their way to the surface of the soil, and it is possible that the movements of the *Boreus* pupa serve the same purpose. Busck and Böving[1] say the following concerning this Eriocranid pupa, p. 155–6: "While all the other appendages are loose, not glued together as is normal in a Lepidopterous pupa, it is mainly the head and the mandibles and abdominal segments, which are movable and utilized in locomotion, when the pupa digs up through the earth." In *Boreus* the pupal mandibles are about as long as two thirds the distance from their base to the lower portion of the eyes, 4-dentate and several times the size of the small 2-dentate mandibles of the adult insect.

Unfortunately almost all my pupæ were destroyed by a fungus, so that I was unable to rear more than a single *brumalis*. Towards the end of November, the pupæ had become very scarce, though what I took to be deserted open pupal chambers were not uncommon locally. With diligent search, however, I managed to find a single, well advanced pupa on November 22, and this, seven or eight hours later, disclosed a fully or nearly fully pigmented and active male *brumalis*. This insect lived for fifteen days confined in a jelly tumbler half-filled with damp moss. It always kept to the higher places and walked about in leisurely fashion, its metallic blackish head glistening in the light. It contrived to escape once, when it traveled by well-directed six-inch hops.

---

[1] On *Mnemonica auricyanae* Walshingham, Proc Ent. Soc., Wash., XVI, pp. 151–162, pl. IX–XVI, 1914.

I was unable to find any adults where I had secured the pupæ, though conditions seemed favorable for their presence. The life of the imago must be rather long, however, as it appears to have a somewhat protracted season. So, too, the larval period seems to be rather extended.

It is to be hoped that inasmuch as this curious winter insect is largely confined to the base of trees and is at times not uncommon, the complete life-history may soon be worked out.

A NEMATODE PARASITE OF ROOT APHIDS.[1]

By John J. Davis,

United States Bureau of Entomology, West Lafayette, Ind.

Parasites of root-infesting plant lice are so rarely encountered that this record of a nematode attacking a root aphid is especially interesting. We first found apterous viviparous and oviparous individuals of a new species of *Anœcia* infested with nematodes at Lafayette, Ind., October 16, 1911, and again on October 19, and, although a number of collections were made at frequent dates

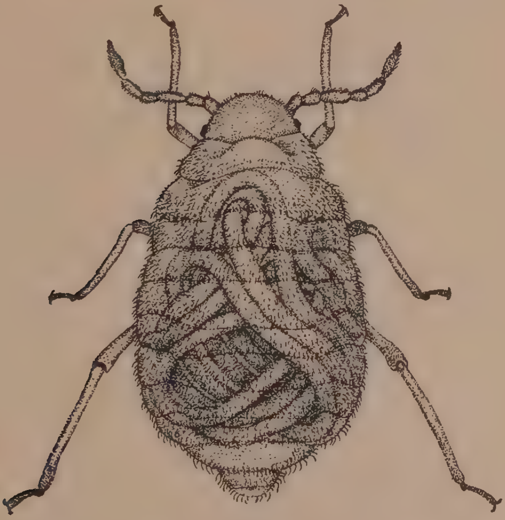


Fig. 1. *Anœcia* sp. infested with a Nematode.

---

[1] Published with the permission of the Chief of the United States Bureau of Entomology.

between September 15 and October 15 from nearby plants, no parasitized aphids were found earlier than the dates mentioned above. The aphids were on the roots of *Muhlenbergia* and rather near the surface; that is about a half inch below the surface of the ground. The coiled and twisted worm was visible within the body of the aphid but after clearing and mounting in balsam it became much more distinct. The accompanying illustration, kindly drawn for us by Dr. Henry Fox, is a very characteristic likeness of the nematode worm within the body of the aphid. The nematode proved indeterminable and it is not unlikely that the aphid is simply an intermediary host.

We know of but one other record of a nematode infesting an aphid. Dr. G. Del Guercio, on page 205 of Nuove Relazioni of the Royal Station of Agricultural Entomology of Florence (Vol. I, 1899), records a nematode as one of the natural means which limits the diffusion of *Trama radicis* Kaltenbach, a root aphid, and on the following page gives a simple outline drawing of the nematode worm.

SOME NEW FORMICID NAMES.

By William Morton Wheeler,
Bussey Institution, Harvard University.

Forel's discovery, in 1913, that the East Indian ant, long known under the name of *Aphænogaster* (*Ischnomyrmex*) *longipes* F. Smith (1857), is really a *Pheidole*, and the type of the subgenus *Ischnomyrmex*, makes it necessary to change the name of *Pheidole longipes* Pergande (1895) of southern California and Mexico. I would propose for the latter the name *Pheidole grallipes* nom. nov.

Owing to the fact that I was unable to receive any proof, my recent paper on the ants collected by Capt. S. A. White in Central Australia (Trans. Roy. Soc. South Austr. 39, 1915) contains two unfortunate errors. The name *Polyrhachis* (*Campomyrma*) *longipes* (p. 821), applied to one of the new species, is preoccupied by that of *Polyrhachis longipes* described by Frederic Smith in 1858 from the Aru Islands. I would, therefore, change the name of the Australian species to *P.* (*C.*) *macropus* nom. nov.

Examination of several fine series of *Camponotus* (*Myrmophyma*) *inflatus* Lubbock, the famous honey ant of Central Australia, recently received from the Museum of South Australia, shows that what I described as *Camponotus* (*Myrmamblys*) *aurofasciatus* (p. 817) is merely the hitherto undescribed minor worker of Lubbock's species. Forel is probably right in assigning it to the subgenus *Mrymophyma.*

NEW ENCYRTIDAE FROM NORTH AMERICA.

By A. A. Girault,
Bureau of Entomology, U. S. Department of Agriculture.

Signiphora flavopalliata occidentalis Howard.

Two females from *Chrysomphalus aurantii citrinus*, Avondale, Cal., October 24, 1911. P. H. Timberlake. 14527 D.

Signiphora thoreauini sp. nov.

Female: Length, 0.55 mm. Differs markedly from *aleyrodis* in having the antennal club all black, the cephalic part of the mesoscutum is only slightly darkened, the band on the abdomen is slightly shorter. From *basilica* in lacking the disto-marginal spot on the abdomen, the less colored cephalic thorax, the wholly black club and its greater length. From *lutea* as from *aleyrodis* and in its greater slenderness.

From one female on a slide labelled "From *Aspidiotus hederæ* on Soy, Santa Barbara, Cal., November 14, 1911. P. H. Timberlake. 14594 C." *Type:* Catalogue *No. 19209*, U. S. N. M., the above specimen.

Neosigniphora elongata sp. nov.

Female: Length, 1.35 mm. Rather long in proportion to its width. Agrees with the description of *Signiphora australica* Girault (the legs, however, dark except the yellow tarsi and the yellow dusky front legs); fore wings clearer near tip and under all of submarginal vein; the marginal cilia at apex are over half the greatest wing width. Hind wings broad. Differs notably from *australica* in the antennal club which is slender, six or more times longer than wide. Scape long and slender, the pedicel not half its length.

Described from one female on a slide labelled "Webster No. 11824, Elkpoint, S. D., March 28, 1914. Reared from a coccid on *Muehlenbergia*, C. N. Ainslie." The four ring-joints in the genotype are verified. *Type:* Catalogue *No. 19210*, U. S. N. M., the foregoing female.

Aneristus oculatipennis sp. nov.

Female: Length, 1.65 mm. Black, the tarsi white; apex of scutellum very narrowly around the margin and a broad band across the scutum just back of the cephalic margin, yellowish white; band on scutum occupying somewhat over a third of the surface. Propodeum centrally at apex suffused with yellowish. Body very finely scaly, the head and thorax with numerous, small setigerous punctures, densest on the scutum. Cephalic femora strongly compressed. Fore wings hyaline but with a large, three-fourths-complete circular smoky ring from somewhat less than the distal two thirds of the marginal vein and extending beyond the venation, its open fourth facing the caudal wing margin and partly closed by a fainter dusky stripe opposite the opening and along the caudal margin; the distal margin of the ring is less than its width (not diameter) from the blade's apex; this ring makes a central, large ocula some distance distad of middle, opposite distal marginal vein. Stigmal vein sessile, minute, globular. Middle tibial spur long and *stout* as in normal encyrtids. Axillæ advanced. Parapsidal furrows mere sutures. Caudal femora and tibia compressed, the tibiæ with stiff black bristles dorsad and with two stout, black, subequal spurs. Mandibles broadly subtruncate but bidentate as in *Baoanusia*, the first tooth shorter than the large truncate second one. Scape pale beneath; flagellum subcylindrical, the funicle joints a little flattened, 1 nearly as long as the scape, three-fourths longer than wide at apex, 3 a little longer than wide, much larger than the pedicel; club 1 slightly wider than long. One distinct ring-joint. Maxillary palpus 2-jointed, the second joint ending in a long slender bristle; labials 1-jointed and similarly terminated. Club well-defined.

From five females reared from *Saissetia oleæ*, Catacaos, Peru. The date of the rearing is September 14, 1912. Rust, collector.

Types: Catalogue *No. 19211*, U. S. N. M., four females on two tags plus a slide bearing appendages.

Nebaocharis gen. nov. (Ectromini)

Female: In Ashmead's table runs to *Anusia* Foerster but differs in having the antennal club solid, the ovipositor exserted for three fourths the length of the abdomen, wings are present in the shape of large scales and the head is not so long, not so narrowed beneath the eyes, the cheeks short. Also the pronotum is less conical, shorter than the scutum or scutellum. Abdomen slender, depressed, its segments very indistinct. Head subquadrate but somewhat narrower toward the mouth (cephalic aspect), the face lenticular but the short, rather shallow scrobes forming a short semi-circle. Axillæ apparently rather widely separated. Hind tibial spur single. *Type*: *N. hemipterus*, sp. nov.

Nebaocharis hemipterus sp. nov.

Length, 1.00 mm. Dark brown, the abdomen, antennæ, extruded valves of the ovipositor and the hind legs, purplish black; scutellum nearly black. Legs, including the caudal tibia just below knee and the caudal tarsus, yellow. Body glabrous or nearly but the head coarsely scaly. Pedicel not flattened, slightly longer than wide, slightly longer than funicle 3 which is slightly the longest, 6 subequal to 2, 1 cupshaped and smallest, all wider than long and compressed; club conical, no wider than the funicle and about half its length. Scape greatly dilated. Flagellum clothed with very short hairs.

Described from one female in the U. S. N. M. collections, labelled "Colorado, 2019. C. F. Baker." *Type:* Catalogue *No. 19312*, U. S. N. M., the specimen on a tag, the head and a hind leg on a slide.

Xanthoencyrtus Ashmead (= *Scelioëncyrtus* Girault.).

The original description of Xanthoencyrtus disagrees with my own of *Scelioëncyrtus*, which is correct. The club is 2-jointed, and the genus must at present be regarded as an Ectromine. *Xanthoëncyrtus nigroclavatus* Ashmead appears to be common in the United States; through the Bureau of Entomology I have seen a series of both sexes labelled "Webster No. 11811, Elkpoint, S. D.

C. N. Ainslie, collector. Parasite reared from Panicum coccid." The male club is solid, the funicle joints distinctly longer than wide, with scraggly hairs. There are three Australian species.

Epanusia albiclava sp. nov.

Female: Length, 1.20 mm. Dark metallic purple, the fore legs (except the coxæ) reddish brown, the middle tibiæ and tarsi and the club yellowish white. Head sculptured as in the genotype. Fore wings embrowned from near base to apex and crossed by a broad, naked hyaline band from all of the marginal and as much of the submarginal veins. Oblique hairless line not differentiated. Head bombyciform (as in the honey bee), a distinct carina between the antennæ, the scrobes running half way up the face but not joining, the face sublenticular. Axillæ slightly separated. Dorsal thorax sculptured and clothed as in the genotype. Marginal vein two and a half times longer than wide, postmarginal vein a little longer than the stigmal, somewhat shorter than the marginal. Fore wings rather narrow for the family but still large. Funicle widest at 2, 1 triangular and longest, widest distad, 6 smallest of the funicle, slightly longer than wide; club cylindrical. Mandibles small, their equal teeth acute. Ovipositor as in *Anagyrodes*.

From a female in the U. S. N. M. collection, taken by sweeping in the fair grounds, D. C., October, 1883. *Type:* Catalogue *No. 19313*, U. S. N. M., the above specimen and a slide bearing a head, fore wing, antenna and portion of a hind leg.

Epidinocarsis subalbicornis sp. nov.

Female: Length, 1.50 mm. Dull black, including the venation, the wings hyaline, the antennæ distad of funicle 1 pure white; also the apex of the pedicel obliquely ventro-proximad and a stripe across the scape near its apex. Mesopleurum orange yellow, except at caudal margin. Tegulæ white at base. Propleurum whitish. Legs white except hind coxæ. Marginal vein a little over twice longer than wide, subequal to the stigmal, the postmarginal very short; hairless line closed caudad, rather broad, the wing ciliated proximad of it to base. Pedicel over twice longer than wide at apex, somewhat shorter than funicle 1 which is fully 2½ times longer than wide and longest. Funicle 6 a third longer than wide. Thorax very densely, minutely scaly and hispid, the very short stiff hairs white; a carina between the axillæ. Abdomen and head sculptured like the thorax, the head pubescent like the thorax. The apex of the acutely triangular scutellum reaches base of the abdomen. Scrobes distinct yet the head sublenticular. Frons moderately broad, the lateral ocellus its own diameter from the eyes.

Described from two females labelled "State Insectary, Cal., 675 A, Fresno, Cal., associated with mealy bugs on grape." *Types:* Catalogue *No. 19314*, U. S. N. M., two females on tags plus a slide with female head and fore wing. One of the females is a paratype.

Formicencyrtus gen. nov. (Encyrtini)

Female: Head ant-like, held nearly horizontally. Runs close to *Anusia* Foerster but the abdomen is somewhat as in *Anastatus*, that is depressed (the ovipositor shortly extruded) but in shape it is broadly oval (dorsal aspect), the second segment occupying about half of the surface, segment 6 two thirds as long as 2, the others short. The wings are like large scales but veinless and inconspicuous. Otherwise agrees with the structural characters of *Anusia flava* Girault except that the scutellum is not triangular but round at apex and there is a minute third mandibular tooth. *Type: F. thoreauini*, sp. nov.

Formicencyrtus thoreauini sp. nov.

Female: Length, 1.58 mm. Reddish brown, the propodeum darker, the abdomen dorsad metallic purplish, yellowish at apex, the funicle and club black, the short, extruded part of the ovipositor whitish. Fore wing gradually narrowing distad, somewhat over three times longer than wide at base, hispid, with minute scattered marginal cilia. Mandibles with two equal acute teeth and a third very minute obtuse one. Hind tibiæ with one long, slender spur. Scutellum and axillæ lemon yellow. Body coriaceous to subglabrous, the propodeum glabrous, non-carinate, pubescent laterodorsad. Axillæ with a very short carina between them, together with the scutellum opaque and more coriaceous than the rest of the body. Dorsal abdomen downy, the hairs white and reclining. Tegulæ large; scutellum, scutum and propodeum of about equal length. Dorsal thorax very sparsely hairy. Caudal margin of segment 2 of the abdomen slightly concavely incised at the meson. Pedicel normal, slightly longer than wide at apex and than funicle 1, the latter longest but only slightly so, the joints all somewhat wider than long. Club obliquely truncate from the base of joint 2. Scape very greatly foliaceously dilated ventrad. Funicle compressed. Genal suture absent.

From two females on tags in the U. S. N. M. collections labelled "5817^{02}. On *coccus confusus*. Mesilla Park, New Mexico. Cockerell. Emerged December 14, 1896." *Type:* Catalogue *No. 19315*, U. S. N. M., the two females on tags and a slide bearing a hind leg, a wing and a head. One female a paratype.

Zaommoëncyrtus submicans Gen. et sp. nov. (Encyrtini)

Female: In my table of the earth's genera runs to *Zaomencyrtus* Girault but differs in having the scape foliaceously dilated, the funicle joints annular; the stigmal vein is subequal to the marginal which is twice longer than wide, twice the length of the postmarginal. Hind tibial spur short, single, distinct. The middle tooth of the mandible is distinctly longest, the first shortest, a minute tooth, distinctly shorter than the others; third tooth half the length of the middle one. Head quadrate (cephalic aspect). Frons very broad. Eyes round-oval, about as long as the cheeks. Vertex rather thin. Face in death circularly depressed, the frons depressed. Axillæ separated distinctly for some little distance, the suture separating from the scutellum delicate. Form slender, rather flattened, not elongate. Head somewhat as in *Spalangia* but shorter.

Female: Length, 1.00 mm. Shining purplish black, the wings lightly dusky from about the bend of the submarginal vein, the duskiness accented under the head of that vein and under the marginal vein; tibiæ, except just below the knees and the tarsi yellow. Venation fuscous, the stigmal vein paler. Body very delicately scaly, shining like the surface of tar. Second joint of club obliquely truncate, longest, the club enlarged and barely shorter than the funicle. Pedicel stout, slightly longer than wide; funicle joints enlarging distad, 6 over thrice the size of 1 or 2 or 3 which are annular and subequal. Pedicel over a third the length of the body of the scape. Hind wings with about fourteen rows of discal cilia. Fore wing with a white streak caudad from the proximal margin of the discal ciliation, parallel with the caudal margin.

Oblique hairless line rather broad with but several lines of cilia proximad of it. Abdomen no longer than the thorax, the ovipositor tipping it.

From six females "Hopk. U. S. 10958 c., July 27, 1914. On *Nyctobates pennsylvanica*, Shiremantown, Penn. Hicoria. W. S. Fisher." *Type:* Catalogue *No. 19316* U. S. N. M., a female on a tag; five female paratypes.

Ceraptroceroideus Gen. nov. (Encyrtini).

Female: In my table of genera runs to *Ceraptrocerus* Westwood but wingless, the head is not oblong but subquadrate (cephalic aspect) and the second segment of the abdomen occupies nearly half of the surface, the sixth next largest, two-thirds the length of the second. Pronotum extremely short. Scutum wider than long but as long or nearly as the normal scutellum whose rounded apex reaches to the base of the abdomen. Axillæ separated for some distance. Vertex flat, the face inflexed, the frons prominent. Vertex of moderate width. Mandibles with the inner two teeth formed by a concaved broad second inner tooth whose lateral or dorsal apex is acute. Fore wings mere scales which are somewhat longer than wide, with a broad costal cell and distinct submarginal and marginal veins, the latter much shorter than the former. Middle tibial spur long and stout, the caudal spur single, slender. Ovipositor slightly extruded, pointing the abdomen. *Type: C. cinctipes*, sp. nov.

Ceraptroceroideus cinctipes sp. nov.

Female: Length, 1.10 mm. Purplish black, the scutellum except lateral and caudal margins narrowly and the rest of the dorsal thorax, except the tegulæ and much of the surface of the scutum, reddish brown. Head purplish black, the vertex bright lemon yellow, except the lateral margins unnarrowly along the eyes and the cephalic margin broadly. Face with a broadly curved, narrow lemon yellow stripe across it just under the vertex far dorsad of the antennæ, its (lateral) ends terminating under the eye ends. Lateral ocellus in the mesal margin of the lateral black border of the vertex, over its diameter from the eyes. Head finely scaly. Eyes partly on the vertex, the cheeks longer than them. Cephalic legs purple except tips of the tibiæ broadly and the four proximal tarsal joints.

Middle legs purple except the same tarsal joints and the distal two-thirds of the tibiæ, this latter white portion with a black *cinctus* at its middle. Caudal legs all purple, except the three proximal tarsal joints and a broad white *cinctus* a little proximad of the middle of the tibiæ. Abdomen shining, subglabrous. Dorsal thorax scaly, the scutellum more densely so; scutum with sparse pubescence. Antennæ wholly flat. Pedicel triangular, slightly longer than funicle 6. Scape greatly dilated. Funicle joints decreasing in width, increasing in length distad, 6 somewhat wider than long, 1 over twice so, all the joints with their distal margin concave. Club conico-cylindrical, its first joint subquadrate, largest. Fore wings with black, scattered stiff bristles disco-distad and from its cephalic margin, with a fuscous dash across at the thickening of the submarginal vein, a dusky spot against the apex of the venation and an irregular dusky blotch across the apex.

What appears to be the male is very different—winged, the marginal vein somewhat longer than wide, the postmarginal just developed, the stigmal very short, half the length of the marginal. The wings are hyaline and fully developed. Vertex flat but shorter than in the female, the frons less prominent. The antennæ are filiform, the club solid, the scape only compressed-cylindrical, somewhat shorter than the club; pedicel globular; funicle joints cylindrical, 1 longest, nearly twice longer than wide, 6 somewhat longer than wide. Funicle and club with rather long, scraggly hairs. The legs are concolorous except the proximal four tarsal joints of the first two pairs of legs, the proximal joint of caudal tarsi, the cephalic knees and tips of cephalic tibiæ, middle knees and tips of middle tibiæ and a white central cinctus on middle tibiæ (therefore, two concolorous cincti; the knees include the base of the tibiæ and the apex of the femur). The fore femur, caudal femur and tibia are compressed. The head of the male is wholly concolorous.

Described from two males, one female "From *Aspidiotus helianthi* Parr on *Eugerion canadense*, Wellington, Kans., October 8, 1908. E. G. Kelly." *Types:* Catalogue *No. 19317*, U. S. N. M., the above specimens on tags with a slide bearing a male head and fore wing and female head, legs, antenna and fore wings. One male a paratype.

Paracopidosomopsis Gen. nov. (Encyrtini).

Female: The same as *Berecyntus* Howard but the mandibular teeth are small and subequal. *Type: B. floridanus* Ashm.

This species is closely allied with the so-called *Copidosoma truncatellum* Dalman (at least specimens from Europe in the U. S. National Museum, so labelled) which is congeneric, but the American species differs in having a distinct, rectangular fuscous patch against the stigmal and marginal veins with a more suffused area caudad of it, while in the European species the wings are hyaline. Otherwise the two are certainly much alike. Mr. A. B. Gahan has identified a series of *floridanus* as *truncatellum* but for the present I do not think the two can be regarded as the same. These specimens were labelled "Laf. 11. Lafayette, Ind., J. J. D. Reared from cabbage Plusia larva."

Berecyntus Howard.

In my table of genera runs to *Copidosomopsis* Girault but differs in the following essentials: The marginal vein is somewhat longer than wide, the postmarginal distinct, about half the length of the marginal, the abdomen is broader, flat and subcordate, the stigmal vein is slightly longer than the marginal. Axillæ rather broadly joined. Mandible with the third tooth minute, the first long, over twice the length of the second which is over four times the size of the third. Ring joint very minute. Club solid, obliquely truncate. Hind tibial spur single, the middle one enlarged. Genal suture absent. Scrobes not reaching to the middle of the face yet distinct, of tolerable length, forming an inverted "V." Club wider than the funicle and about three fourths its length.

Berecyntus bakeri Howard, var. **gemma,** var. nov.

Female: Length, 1.15 mm. Metallic blue-green, the middle knees and all tarsi except the distal joint, reddish-brown, the venation blackish, the fore wings lightly infuscated from the head of the submarginal vein distad to the apex. Funicle joints increasing gradually in width distad, 1 quadrate not half the length of the pedicel, subequal to 2, 6 somewhat wider than long. Pedicel distinctly longer than wide at apex, nearly half the length of the club which is a little shorter than the body of the scape. Hind wings with about sixteen lines of uniform discal cilia where broadest. Fore wing with only about two short lines of coarse cilia proximad of hairless line. Whole body scaly reticulate. A very short, delicate carina between the axillæ. Scutellum more finely scaly than the scutum. Ovipositor not prominent.

The male is similar to the female but the scutellum is scaly like the rest of the thorax, the funicle joints all somewhat longer, subquadrate, the club shorter; the third tooth of the mandible is longer, the other shorter. Wings hyaline.

Described from a male and a large number of females labelled "From an *Euxoa* larva, Queensboro, Ontario. A. Gibson;" also "from larva of *Hadena devastatrix*, Ottawa, Canada, July 12, 1914. A. Gibson." *Types:* Catalogue *No. 19318*, U. S. N. M., 8 females on five tags (seven paratypes).

Differs from the typical form in having the fore wings narrower and the venation black; both forms bear a rectangular fuscous patch along the stigmal vein. Type locality, Ottawa.

Berecyntus bakeri Howard var. **arizonensis** var. nov.

Female: Differs from *bakeri bakeri* in having the fore wings distinctly more dusky, infuscated throughout from the bend of the submarginal vein.

Described from four females from Phoenix, Ariz., March 20, 1915. From *Choraxagrotis* species. H. O. Marsh, Chtn. No. 978. *Types:* Catalogue *No. 19319*, U. S. N. M., the above specimens on separate tags; three paratypes, one type.

THREE NEW NORTH AMERICAN SPECIES OF THE GENUS *AGROMYZA* (DIPTERA).

By J. R. Malloch,
Urbana, Ill.

Herewith are presented descriptions of three undescribed species of *Agromyza* from Illinois. The type specimens are deposited in the collection of the Illinois State Laboratory of Natural History.

This paper is published by permission of Dr. Stephen A. Forbes, State Entomologist of Illinois.

Agromyza subangulata sp. nov.

Male: Black. Head black, only the apex of proboscis yellow; frons opaque, brown-black, orbits subshining; lunule whitish pollinose. Thorax shining black, disc of mesonotum distinctly brownish pollinose, central vertical suture and upper margin of pleuræ from wing base nearly to anterior extremity narrowly lemon-yellow; roots of wings lemon-yellow; scutellum concolorous with disc of mesonotum. Abdomen unicolorous glossy black. Legs black; fore knees and bases of tarsi yellowish. Wings clear, bases of thick veins lemon-yellow, remainder brown. Squamæ pale yellow, fringe concolorous. Halteres pale yellow.

Frons more than a third the width of head; orbits distinct, each at widest part about half as wide as is center stripe at same part; five orbital bristles present, which are of moderate length, slightly decreasing anteriorly, the anterior two pairs incurved; orbital hairs sparse; antennæ small, third joint disc-like, slightly pilose; arista bare, tapering, its length about one third more than anterior width of frons; face very slightly receding below; cheek very narrow, at middle about one eighth as high as eye, the latter about one and a third times as high as long; marginal hairs not very numerous, but distinct, vibrissa moderately differentiated. Mesonotum with four pairs of dorso-central bristles; discal setulæ rather long and hairlike, about eight rows between the anterior dorso-centrals; the pair of bristles between the posterior dorso-centrals hardly distinguishable from the discal setulæ. Abdomen ovate; surface with many setulose hairs; hypopygium of normal size. Legs normal; mid tibiæ with the posterior bristles small. Wing with costa to end of fourth vein; veins 3 and 4 distinctly divergent at apices, reaching wing margin at about equal distances before and behind wing tip respectively; inner cross-vein in vertical line with apex of first vein, and distinctly beyond middle of discal cell; outer cross-vein distant its own length from inner; last section of fourth vein four times as long as penultimate section; last section of fifth subequal with the preceding section; auxiliary indistinct but complete; sixth vein reaching three fourths of distance to wing margin. Length, 2.5 mm.

Type locality, St. Joseph, Ill., May 3, 1914 (Hart and Malloch). Food plant unknown.

This species will "run down" to *angulata* Loew in my table of species in this genus,[1] but may be readily separated from it by the characters of the wing venation.

Agromyza albidohalterata sp. nov.

Male: Black, shining. Frons with center stripe reddish yellow, ocellar region, and orbits except their lower portions black; antennæ reddish yellow; arista brown; face and cheeks grayish yellow, the former slightly blackened on center and mouth margin; proboscis yellow; palpi brownish; back of head black. Thorax without any yellow markings, the suture between upper portion of pleuræ and mesonotum brownish, no distinct surface pollinosity. Abdomen more distinctly shining than thorax, the segments unicolorous black. Legs black, knees brownish; all tarsi yellowish except at apices. Wings clear, veins brown. Squamæ whitish, margins and fringes grayish. Halteres yellow, the knobs white. All bristles black.

Frons nearly half the width of head, orbits distinct, each about half as broad at its broadest part as is center stripe at same part; orbital bristles situated close to inner margin of orbits, five pairs present, the upper pair rather weak, the others becoming successively weaker towards anterior margin, the last (anterior) pair very weak, anterior three pairs incurved; no distinguishable orbital hairs; antennæ rather small, third joint rounded, its surface with white pile; arista rather thick, its length about equal to anterior width of frons, pubescence very short; cheek nearly twice as high as third antennal joint and half as high as eye, marginal hairs weak, vibrissa not well differentiated; height of eye one and a third times its length. Mesonotum with two pairs of very weak dorso-central bristles, the disc covered with rather closely placed hairlike setulæ; scutellar bristles weak, the pairs subequal in length. Abdomen slightly longer than thorax, the segmentation very distinct, surface hairs weak but numerous; hypopygium normal. Legs normal in shape; mid tibiæ without discernible posterior bristles. Wings normal in shape; first costal division more than three fourths as long as second; third vein ending midway between apex of fourth vein and apex of second; fourth ending almost exactly at apex of wing, these three veins distinctly divergent on their last section;

---

[1] See Ann. Ent. Soc. Amer., Vol. 6, 1913, p. 271.

inner cross-vein distinctly before end of first vein and two fifths distant from apex of discal cell; outer cross-vein distant about its own length from inner, and very slightly beyond end of first vein; last section of fourth vein about two and a half times as long as the preceding two sections combined; penultimate section of fifth about two thirds as long as last section. Halteres with exceptionally large knob. Length, 2 mm.

Type locality, St. Joseph, Ill., May 17, 1914 (C. A. Hart). Food plant unknown.

This species will "run down" to *varifrons* Coquillett in the table previously referred to, but may be separated readily by the color of the frons and by the wing venation. In *varifrons* the black of the frons is not confined to the orbits and ocellar region, but extends over the central stripe, on its upper third at least. The last section of fifth vein of wing in the same species is subequal in length with the preceding section, and the second costal division is nearly twice as long as the first.

Agromyza nigrisquama sp. nov.

Female: Black, subopaque. Wings clear, veins black. Squamæ black-brown, fringes concolorous. Halteres yellow, knobs lemon-yellow.

Frons with center stripe opaque, orbits slightly shining, each about one fifth as wide as center stripe, width of frons at vertex slightly over one third the head width, a little narrowed anteriorly, 4 pairs of bristles on orbits, the anterior 2 pairs incurved, the posterior 2 pairs reclinate, orbital hairs sparse; antennæ of moderate size, second joint with distinct dorsal bristle, third joint rounded; arista bare, tapering at base, its entire length equal to from its base to upper orbital bristle; cheek about one sixth the eye height, marginal bristles weak, vibrissæ well differentiated. Mesonotum with 4 pairs of dorso-centrals, the anterior pair in front of suture; no distinct bristles between posterior dorso-centrals; discal setulæ in about 8 irregular rows between anterior dorso-centrals. Abdomen with rather long hairs, especially at apex; ovipositor short, obtuse. Legs slender, the mid tibial setulæ present. Wings broad, costa to end of fourth vein; inner cross vein at distinctly beyond middle of discal cell and slightly before end of first vein; outer cross vein at about its own length from inner; last section of fourth vein 6 times as long as penultimate section; veins 3 and 4 gradually divergent on their last sections; last section of fifth vein about one third longer than penultimate section. Length, 2 mm.

Type, Monticello, Ill., June 28, 1914 (J. R. Malloch). Taken by sweeping vegetation on bank of Saugamon River. Food plant unknown.

This species will "run down" to section 34 in the table referred to previously, but may be separated from both of the species therein by the comparative lengths of the last 2 sections of fifth vein as well as other characters. Both *isolata* Malloch and *fragariæ* Malloch have the last section of the fifth vein shorter than the penultimate section.

A NEW SPECIES OF THRIPOCTENUS (Chalcidoidea).[1]

BY L. T. WILLIAMS.

During an afternoon's collecting in a swampy spot near the Arnold Arboretum, Forest Hills, Mass., a few galls on willow twigs were secured and brought into the laboratory at the Bussey Institution. A casual examination on the date of their collection (July 22, 1915) showed that they contained immature insects of some sort, but no further attention was paid them until August 10, when the galls were opened and found to contain several large black thrips, and a single minute Chalcidoid parasite. Any possible doubt as to the relationship between the insects was removed when the parasite was identified by Professor Brues as belonging to the genus *Thripoctenus*, which is known to be an enemy of the Thysanoptera.

The genus *Thripoctenus* was proposed in 1911 by Crawford for a new species from California, belonging to the sub-family Tetrastichinæ, and described by him under the specific name of *russelli* in honor of its discoverer, the late Mr. H. M. Russell. A second species has recently been described in Europe by Vuillet. I have not had access to this description but the differences in habitat and in the systematic positions of the hosts would indicate that the present species is perfectly distinct. The characters distinguishing it from the type species are well marked, as will be noted later.

---

[1] Contributions from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 112.

The following description contains certain characters of generic, rather than specific value, which are included merely for convenience in identifying specimens.

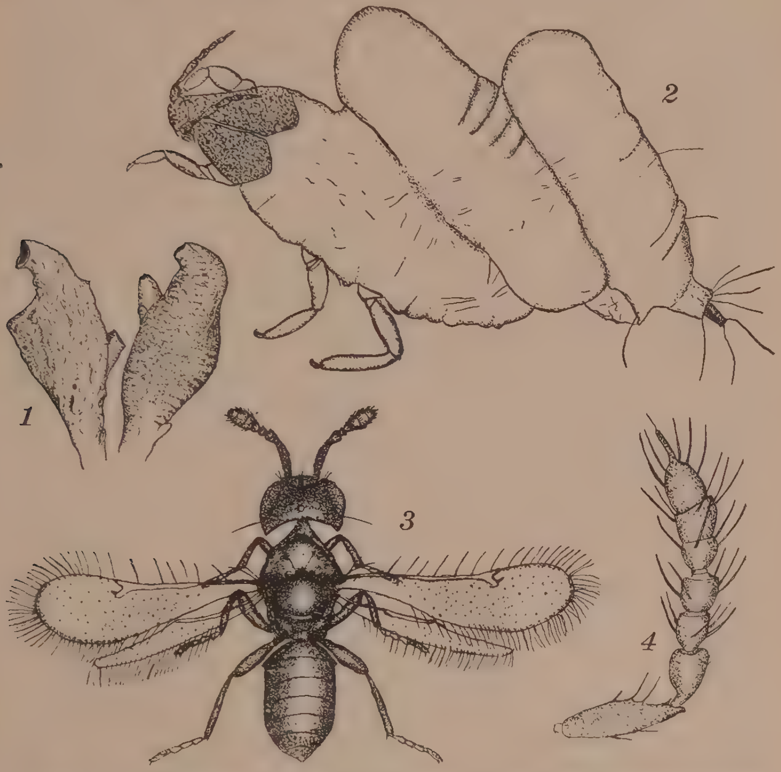


Fig. 1. 1, Willow galls occupied by thrips; 2, Parasitized thrips containing three larvæ of *Thripoctenus nubilipennis*; 3, *Thripoctenus nubilipennis* ♀; 4, Antenna of same, ♂.

Thripoctenus nubilipennis sp. nov.

Female: Length, 0.7–0.9 mm. Antennæ inserted just above the clypeus, 7-jointed, the club of 3 segments and the funicle of 2, the latter shorter than the pedicel. Head as wide or slightly wider than the thorax, seen from in front distinctly wider than long. Clypeus with a distinct keel. Front broad, strongly concave. Inner eye-margin with a row of bristles, the posterior one long and conspicuous. Ocelli in a low triangle. Genæ prominent, well-developed. Mesonotum convex, somewhat cordate, owing to a posterior cleft or indentation. Parapsidal furrows incomplete, indistinct during life. Scutellum oval, without longitudinal furrows. Tegulæ with a pair of bristles. Abdomen elongate-ovate, about as long as the thorax, laterally keeled or compressed. Ovipositor scarcely visible when at rest. Color, black, highly polished, tarsi, except for dusky terminal joints, testaceous. Antennæ dark, but translucent, hence appearing yellowish when mounted; clothed with whitish hairs. Eyes very dark russet-red, almost black; ovipositor yellow, transparent. Wings with a distinct median cloud, and a marginal thickening or pigmentation extending from the end of the post-marginal vein to a point on the posterior margin opposite the stigmal vein. Wing-cilia very long, dark-colored.

Male: Smaller (on the average) than the female, abdomen slenderer more abruptly tapering. Antennæ 7-jointed, as in female, but differing as follows: scape broader, pedicel shorter than the funicle, club much less marked. Joints of the flagellum with whorls of bristles. Terminal joint with a rod-like, bristle-tipped prolongation, about two-thirds as long as the joint. Color, as in female.

This species is very readily distinguished from *T. russelli* by its uniformly black color and clouded wings. The rod-like appendage of the male is very curious and distinctive, though it may pass for an ordinary bristle if not closely examined under a compound microscope. I presume that it is characteristic of the genus, though I have no means of knowing this, the male of *T. russelli* being as yet undescribed.

Habits of the Hosts.

Specimens of the thrips were sent for determination to Dr. J. D. Hood of the Biological Survey, who kindly identified them as belonging to two species, *Megalothrips spinosus* Hood and *Cryptothrips rectangularis* Hood, both members of the family Phlœothripidæ. Unfortunately, the larvæ of the two forms were not distinguished during the course of my observations, and it is impossible to ascertain at present whether their relations to the parasite are different, but it seems probable that either is attacked without discrimination.

Reprints of nearly all articles that have appeared in Psyche during the years 1911, 1912, 1913, 1914 & 1915 may now be obtained from the publishers.

These are for sale at a uniform price of one cent per page of text or illustrations.

No order for less than 15 cents can be filled and remittance in cash or stamps must accompany all orders. If any reprints cannot be supplied, money will be promptly refunded.

Address all orders to:

PSYCHE,
Forest Hills, Boston, Mass.

Many odd numbers of volumes I, II, III, IV & V are also obtainable. Prices on application.

No attention can be paid to inquiries concerning these reprints or odd numbers unless postage for reply is enclosed.

After the parasite's relation to the Thysanoptera had been established the locality where the galls had been collected was re-visited, and large numbers of additional specimens secured from time to time. These galls were not, of course, the work of the thrips. They were practically all on dead wood, and may have been several seasons old. The commonest type, and that most frequented by the thrips was the one shown in Fig. 1, 1, but the insects were also found in other sorts, among them the well-known "pine-cone" willow gall. The original inhabitant of the gall is therefore of little importance, since the thrips evidently occupy any sort that will accommodate them.

The galls are not a mere temporary shelter, as all stages of the thrips from the egg to the adult were to be found in them, and none were found outside, upon the twigs. There seem to be no definite generations, all stages being obtainable at any time during the period for which they were under observation. What they eat, unless they are able to subsist on the dry wood of the gall, seems a mystery, the dead willows being the only visible source of nourishment. The other insects found in the galls are scarcely sufficient to permit of a regular carnivorous habit, although occasional cannibalism is not unlikely.

Habits of the Parasite.

The life-history of *Thripoctenus russelli* has been studied in detail by Mr. H. M. Russell of the Entomological Bureau. The writer has not been able to treat the present species so exhaustively within the time at his disposal, but the details gathered show many points of similarity between the two species as well as several interesting differences.

Oviposition: On the 16th of August no parasites had issued from the new lot of galls, and to hasten matters a number were cut open, several female parasites rewarding the search. Two or three of these were placed in a vial with an immature thrips. At first they ran around without paying any particular attention to it, but before very long one of them ran up, examined the thrips briefly with its antennæ, and then immediately thrust its abdomen forward between its legs and punctured the larva with its ovipositor. After a moment, however, it relinquished its attempt for no apparent reason. Later the same thrips was approached by a parasite (No. 1) which went through the preliminary motions of oviposition, but before it had completed the action another (No. 2) ran up and pierced the thrips with its ovipositor. After remaining in this position some minutes its applied its mouth to the puncture and sucked the wound for about the same length of time. Meanwhile No. 1 repeatedly brought its abdomen forward as if to oviposit, but failed to do so. Both insects immediately afterwards deposited something on the wall of the test tube, which may have been merely excrement, though in the case of No. 1 it was shaped very like the usual parasitic egg.

Subsequently, numbers of adults and pupæ of the *Thripoctenus* were obtained, and the process of oviposition was frequently witnessed. The thrips and parasites (one individual of each, as a rule) were placed on a glass side within a ring of paraffin, and covered with a cover-slip. Under these unnatural conditions the behavior of the parasites was somewhat capricious. Their first action was almost invariably a systematic examination of their prison, out of which, if there was the smallest space between the wax and the cover they usually succeeded in forcing their way. After these efforts had been brought to a conclusion they might or might not show some interest in the thrips. Often they remained with their antennæ applied to the bodies of the larvæ, without attempting to oviposit. Under such conditions any slight movement on the part of the thrips was likely to stimulate the parasites to action. If they met with the thrips at an unfavorable angle they seldom rectified their position, but let it go. The thrips also showed some variation in their receptions of the attack. They were generally rather quiescent, but sometimes crawled about rapidly in their endeavor to escape. This was usually successful, especially if done just as oviposition commenced, but occasionally a more persistent parasite followed its prey, sidling along to the best of its ability, and still holding on when dragged head-long, or circumvented its victim by mounting on its back. Sometimes the thrips, particularly the pupal forms, protected themselves by violently contorting the tips of their abdomen, and in one case one of them was seen to excrete a drop of brownish fluid on the wings of the Thripoctenus.

Oviposition, when successful, usually required ten or fifteen minutes, and a half-hour was not uncommon. After this there was normally a rather long period of sucking the wound, followed occasionally by a second oviposition. This last, however, was seldom allowed to occur, as I desired to obtain as many parasitized thrips as possible, and usually replaced the infested individuals with fresh ones. There was no particular point selected for attack, though the abdomen was more often pierced than the thorax. In the length of time required for oviposition the species differs markedly from *T. russelli*, which is described as taking less than a minute for the process. The subsequent tasting of the wound appears also to be omitted by the latter species.

The number of larvæ which a parasite would attack was not definitely ascertained. After attacking three or four the female Thripoctenus usually died or made its escape. Those that had already oviposited could be counted upon for a repetition of the process more surely than those which had not so far attempted it.

All stages of the thrips except the adult are attacked, the new-hatched larvæ with an alacrity which appears to be ill-judged, as the larvæ of the parasite can hardly develop in them properly, the pupæ with a reluctance which may be well-founded. At least one pupa transformed after a Thripoctenus had oviposited in it.

Development of the Larvæ: The lengths of the egg and larval stages of the parasite were not determined. It seemed impossible to keep the larval thrips alive after removal from the galls, and moreover, individuals oviposited in under laboratory conditions often proved to have been previously infested. The only method of avoiding this source of error was to raise the hosts from the egg, and this could not be managed. Only occasionally were parasite larvæ obtained by dissection. These were extremely delicate in the early stages. One well-grown specimen, dissected from a pupal thrips, resembled the mature forms, being quite smooth, very faintly segmented, and without any pigmentation in the head.

Parasitization was not obvious until it had reached an advanced stage. At this time the host larva grew mottled and waxy in color, the body was much swollen, and the insect was perfectly torpid, if not dead. In a day or two the outlines of the parasites showed beneath its skin. Owing to the large size of the host, successful multiple parasitism is possible, and indeed appears to be the rule. The plate shows a thrips containing three larvæ, and judging from the groups of pupæ found, even more may complete their development in a single host. This is impossible with the smaller hosts of *T. russelli.* The larvæ are always oriented in the same direction, their heads towards that of the thrips. The skin of the latter soon splits and shrivels to a small pad, to which the larvæ remain attached until they pupate. As in the case of *russelli* the contents of the alimentary canal are retained until after the insect has completed its transformation. This substance, bright crimson at first, loses its color shortly before the pupal stage, and is voided by the adult as a milky fluid.

In a few cases the length of the pupal stage was determined. Five larvæ developed from two thrips (three in one, and two in the other) began to darken on August 31. The first three were completely black by next day, the other two twenty-four hours later. On the 11th of September four of the five pupæ (all of the first lot and one of the other) hatched. Two were males and two females. The last pupa, a female, hatched on the 13th.

Adult: Perhaps the most striking difference between *nubipennis* and the Western species consists in the presence of males in the former. *Thripoctenus russelli* was found to be both parthenogenetic and thelytokous, no males being produced through all the generations that were reared. In *nubipennis* the male is not uncommon, though slightly rarer than the female. Copulation was observed on more than one occasion. It is a process of very brief duration.

The sex of the offspring of unfertilized females could not be determined, owing to the aforementioned difficulty in keeping the thrips alive.

The adults ran about actively but were not observed to fly, and seldom jumped. They did not feed when offered syrup, but the females were fairly well supplied with the juices of the thrips. Those that oviposited frequently survived the others, but four or five days was about the maximum length of life under laboratory conditions.

The presence of a member of this genus in the Eastern States is probably of no economic importance, since the thrips upon which it preys are not injurious. They belong to a different suborder from the hosts of the two species of Thripoctenus hitherto described. Whether or not *nubipennis* would attack members of the Terebrantia could not be determined for lack of material, but the great difference in habit renders it unlikely that it would do so under natural conditions.

Acknowledgments.

My thanks are due Professor Brues for aid in classifying the parasites and for suggestions and references of all kinds during the course of the experiment. To Dr. Hood I am indebted not only for the determination of the hosts as mentioned above, but also for information about their life-history and for references on the parasite. Much use has been made of Mr. Russell's bulletin for purposes of comparison.

References.

Howard, L. O. Report of the Entomologist for 1911, U. S. Dept. of Agriculture.

Crawford, J. C. Proceedings of the Entomological Society of Washington, Vol. XIII, p. 233. *Ibid.*, pp. 235–238.

Russell, H. M. Bull. Bur. Entom. U. S. Dept. Agric., Technical Series, No. 23.

Hood, J. D. Canadian Entomologist, Sept., 1908.

EXCHANGE COLUMN.

Notices not to exceed four lines in length concerning exchanges desired of specimens or entomological literature will be inserted free for subscribers, to be run as long as may be deemed advisable by the editors.

Will exchange insects of various orders for Parasitic Hymenoptera from any part of the world.—C. T. Brues, Bussey Institution, Forest Hills, Mass.

Wanted. Ants from all parts of the world.—W. M. Wheeler, Bussey Institution, Forest Hills, Mass.

Florida insects of all orders, also Fish, Batrachians, Reptiles, Shells and Marine Invertebrates sold by A. G. Reynolds, Gulfport, Florida.

New England Orthoptera identified. I wish to examine adult Orthoptera of all families from all parts of New England. Material will be identified for the privilege of retaining desired examples, for which good exchanges will be given, subject to approval of owner.—A. P. Morse, Wellesley College, Wellesley, Mass.

The undersigned will greatly appreciate receiving records of New Jersey species not listed in Smith's Insects of New Jersey.—Harry B. Weiss, 272 Hale St., New Brunswick, N. J.

Offered for cash, but exchange preferred. Fitch and early Illinois reports; Insect Life; Harris's Insect; many others.—J. F. Hallinen, Cooperton, Okla.

Histeridæ. North American Histeridæ identified or unidentified, desired in exchange for beetles of other families. F. G. Carnochan, Bussey Institution, Forest Hills, Massachusetts.

Hemiptera-Heteroptera. I desire specimens of this group from all regions, especially New England. I will give in exchange species of this and other orders (except Lepidoptera), and will identify New England material. Correspondence desired.—H. M. Parshley, Bussey Institution, Forest Hills, Mass.

Wanted: Psyche, Vol. VIII, No. 265 (May, 1898); No. 267 (July, 1898); No. 268 (August, 1898); Vol. IX, No. 300 (April, 1901). Address, giving price, Librarian, Stanford University, Cal.

Sarcophagidæ from all parts of the world bought or exchanged according to arrangement. North American material determined.—R. R. Parker, Entomological Laboratory, Massachusetts Agricultural College, Amherst, Mass.

Wanted: Transactions American Entomological Soc., Vol. 4; Entomological News, Vol. 2, Nos. 6 and 10; Vol. 8, Nos. 1 and 6; Vol. 9, Nos. 1 and 2; Vol. 10, No. 10; Vol. 11, Nos. 1, 3 and 5. Will purchase at reasonable price.—Howard L. Clark, P. O. Box 1142, Providence, R. I.

Wanted: Insects of any order from ant nests, with specimens of the host ants, from any part of the world; also Cremastochilinæ of the world. Will give cash or Coleoptera, Hymenoptera and Diptera from the United States.—Wm. M. Mann, Bussey Institution, Forest Hills, Boston, Mass.

Ward's Natural Science Establishment

84-102 College Ave.
ROCHESTER, N. Y.

We have purchased the entire stock in trade of the **American Entomological Co., of Brooklyn,** and are now prepared to furnish all the material formerly sold by them.

We call particular attention to our

ONLY GENUINE SCHMITT INSECT BOXES

Insect Cabinets and Exhibition Cases. A full description of these is given in the A. E. Catalogue, No. 9, which will be sent free to those interested.

We make a specialty of material for dissection and can furnish all forms from the lowest invertebrates to vertebrates.

We also manufacture the

AMERICAN ENTOMOLOGICAL COMPANY'S INSECT PINS

which are pronounced superior to all others by prominent Entomologists. If you do not know these send us a trial order.

American Entomological Company's Price List, No. 7 contains a list with prices of our large stock of Lepidoptera as well as description of our various insect collections. Sent free to our customers. Price twenty-five cents to those not on our books.

SUCCESSFUL Text and Reference Books that you want in your library and in your classes.

OPTIC PROJECTION

SIMON HENRY GAGE, Professor Emeritus of Histology and Embryology, Cornell University, and **HENRY PHELPS GAGE, Ph.D.,** Cornell University.

This is a very comprehensive work dealing fundamentally and practically with the Magic Lantern, the Projection Microscope, the Reflecting Lantern and the Moving Picture Machine. Library Binding. 730 pages. Over 400 figures. **Postpaid, $3.00**

HANDBOOK OF MEDICAL ENTOMOLOGY

WM. A. RILEY, Ph.D., Professor of Insect Morphology and Parasitology, Cornell University and **O. A. JOHANSEN, Ph.D.,** Professor of Biology, Cornell University.

A concise account of poisonous, parasitic and disease-carrying insects and their allies, including descriptions and illustrations of the principal species, with keys for their determination, and methods of control. Bound in Library Buckram, medium 8vo. 350 + VIII pages. Send for sample pages. **Price, $2.20 Postpaid**

THE MANUAL FOR THE STUDY OF INSECTS

J. H. COMSTOCK, Professor Emeritus of Entomology, Cornell University.

For past 20 years and still the leading college text. Now rapidly going into schools as a reference guide to insect study. 700 pages. 700 illustrations. Mailing weight, 4 lbs. **$3.75 Net**

THE NATURAL HISTORY OF THE FARM

J. G. NEEDHAM, Professor of Entomology, Cornell University.

A recent successful addition to Natural Science Literature. Well arranged for class work and for private study. 300 pages. Illustrated. **Postpaid, $1.50**

THE HANDBOOK OF NATURE-STUDY

A. B. COMSTOCK, Assistant Professor of Nature Study, Cornell University.

The most extensively used Nature-Study text before the public. Over 200 lessons on common birds, animals, insects, plants, trees, stars and the weather worked out in detail for teachers and pupils. 950 pages. 1,000 illustrations. Send for circular.

Bound in one vol., **$3.25 Net,** mailing weight, 5 lbs.
Bound in two vols., **4.00 Net,** mailing weight, 5½ lbs.

For sale at all book stores or shipped direct from

THE COMSTOCK PUBLISHING COMPANY, Ithaca, N. Y.

The Canadian Entomologist

A Monthly Magazine Devoted to the Study of Scientific Entomology

Volume 46 is now in course of publication. It is the oldest established magazine of the kind in America and has a world-wide circulation. Subscription $2.00 per annum, payable in advance, which includes a copy of the Annual Report of the Entomological Society of Ontario to the Legislature. Editor, Dr. E. M. Walker, Biological Department, University of Toronto, Toronto, Canada.

Published by the Entomological Society of Ontario,
GUELPH, CANADA

1,000 PIN LABELS 25 CENTS! At your Risk. (Add 10c for Registry or Checks)

Limit: 25 Characters; 3 Blank or Printed Lines (12 Characters in Length.) Additional Characters 1c per 1,000. In Multiples of 1,000 only; on Heaviest White Ledger Paper---No Border---4-Point-Type---About 25 on a Strip---No Trimming---One Cut Makes a Label. SEND ME ORDER WITH COPY, FOR ANY KIND OF ARTISTIC PRINTING LARGE OR SMALL. INDEX CARDS, MAPS, SEX-MARKS, LABELS FOR MINERALS, PLANTS, EGGS, ETC. IF QUANTITY IS RIGHT, PRICE IS SURE TO BE. Labels exceeding 3 Lines [Blank or Printed] $2 per M. and up. Orders totalling less than 5,000 double price. Cash (no checks) with order.

C. V. BLACKBURN, 12 PINE STREET, STONEHAM, MASSACHUSETTS

CAMBRIDGE ENTOMOLOGICAL CLUB

A regular meeting of the Club is held on the third Tuesday of each month (July, August and September excepted) at 7.45 P. M. at the Bussey Institution, Forest Hills, Boston. The Bussey Institution is one block from the Forest Hills Station of both the elevated street cars and the N. Y., N. H. & H. R. R. Entomologists visiting Boston are cordially invited to attend.

PSYCHE

The Cambridge Entomological Club has a number of single volumes of Psyche for sale, and can furnish sets complete, except for Vols. XI and XIII, which are entirely out of print.

Volumes II–X	**(each covering a 3-year period), each . . .**	**$3.00**
Volume XII	**(covering a single year), “ . . .**	**1.00**
Volumes XIV–XV and XVII	**“ . . .**	**1.00**
Volumes XVIII–XXI	**“ . . .**	**1.50**

**Address all orders or inquiries to
Editor of Psyche, Bussey Institution, Forest Hills, Boston, Mass.**

Write before sending money, as the supply of some volumes is low.